



Advanced Topics in Rotor Dynamics

Lecturer: Prof. Kshitij Gupta (Indian Institute of Technology (IIT) Delhi, India)

Course description:

First part of lectures (5 Hrs) will cover dynamic analysis and optimum design of super-critical rotors consisting of light weight and high strength fibre reinforced composite shaft and discs. Specifically such issues as beam and shell modes of tubular shafts, layerwise theories, stress evaluations and fatigue design including optimization will be discussed with applications to an automobile propeller shaft, a helicopter tail rotor, ship propulsion, aircraft PTO shaft and an all-composite rotor for a typical aeropropulsion system.

In 2nd part of lectures (5 Hrs.) application of two smart materials namely the shape memory alloy (SMA) and the magnetorheological (MR) fluid to rotor vibration control will be discussed, as well exploring the possibilities of using multiple (SMA, MRF, PZT etc.) smart materials to develop smart rotors. Several ingenious ways of using these materials in rotors will be discussed.

In the 3rd part of lectures (5 Hrs) nonlinear dynamics of both the rigid and the flexible rotors mounted on rolling element bearings will be discussed. Nonlinear effects are due to Hertzian contact between the rolling elements and races, clearance, and the varying compliance effect in the bearing. Recent studies have shown that a flexible rotor is less susceptible to instability and chaos due to bearing non-linearity. A case study on a complex 2-spool flexible (a typical aero gas turbine rotor) with nonlinearity in 'intershaft' rolling element bearing, will be discussed.

TERMINY WYKŁADÓW			
Data	Dzień tygodnia	Godzina	Sala
2013-10-21	Poniedziałek	9-12	Audytorium IMP PAN
2013-10-22	Wtorek	9-12	Audytorium IMP PAN
2013-10-23	Środa	9-12	Audytorium IMP PAN
2013-10-24	Czwartek	9-12	Audytorium IMP PAN
2013-10-25	Piątek	9-12	Audytorium IMP PAN